DOCUMENT RESUME

ED 360 721 EA 025 169

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TITLE The Relationship between School Leadership and School Improvement Outcomes.
PUB DATE Apr 93
NOTE 18p.; Paper presented at the Annual Meeting of the American Educational Research Association (Atlanta, GA, April 12-16, 1993).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Educational Improvement; Elementary Secondary Education; Foreign Countries; *Instructional Leadership; *Leadership Styles; Least Squares Statistics; Models; Multivariate Analysis; Orthogonal Rotation; Outcomes of Education; *Path Analysis; School Restructuring
IDENTIFIERS *British Columbia

ABSTRACT

This paper tests the degree of overlap between operational definitions of transformational and transactional leadership, the nature of the relationships between the constructs of transformational and transactional leadership, and specified outcomes in an empirically derived data set by the application of two forms of analysis. Based on Bass's (1985) model, canonical analysis and partial least-squares analysis are applied to derive two path models. The data set was obtained from 1991 Canadian survey data that measured British Columbian school personnel's perceptions about the Primary Program, a mandated school reform policy. Findings indicate that transformational leadership influences school, teacher, and program/instruction outcomes directly and strongly. Evidence is presented for the positive, correlational nature of the relationship between the two kinds of leadership. The findings cast strong doubts on the usefulness of analyses that assume an orthogonal relationship between transformational and transactional leadership as independent variables. They also support the correlational view of the nature of the relationship between the two types of leadership. This was achieved by examining the structure of the two leadership concepts, the assumptions and procedures underlying the two modes of analysis, and the relationship between leadership and school improvement outcomes as presented in the two path models. Three tables are included. (Contains 44 references.) (LMI)

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THE RELATIONSHIP BETWEEN SCHOOL LEADERSHIP AND SCHOOL IMPROVEMENT OUTCOMES

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Paper presented at the annual meeting of the American Educational Research Association, Atlanta, April, 1993.

EA 025 169

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THE RELATIONSHIP BETWEEN SCHOOL LEADERSHIP AND SCHOOL IMPROVEMENT OUTCOMES

Halia C. Silins

Transformational leadership has been identified as the kind of educational leadership necessary to take schools into the 21st Century (Schlechty, 1990; Sergiovanni, 1990; Fullan, 1991). As a concept, transformational leadership attracted attention through the work of Burns (1978). His analysis of leadership manifested by world renowned leaders provided foundation concepts of ordinary and exemplary leadership identified by the terms transactional and transformational.

Burns (1978) described the most common form of leadership relationship found between leaders and followers as transactional, a term previously used by Downton (1973), when he contrasted transformational with transactional rebel leaders. Bass (1985), Burns (1978), and Hollander (1978) agreed that reinforcement theory formed the basis of transactional leadership which involved a social exchange between leader and follower. Transactional leaders have been characterized as focussing on basic needs and extrinsic rewards as a source of motivation and basis for management. The leader approaches the followers with some transaction in mind and obtains compliance (effort, productivity, loyalty) in exchange for expected rewards (economic, political or psychological). Transactional leaders recognize what followers need and want and recognize and clarify the roles and tasks required for followers to achieve desired outcomes. This form of leadership may produce an efficient and productive workplace but is limited when compared with transformational leadership.

Transformational leaders not only recognize followers' needs, but attempt to raise those needs to higher levels of motivation and maturity while striving to fulfil human potential. Such total engagement (emotional, intellectual and moral) of both leaders and followers encourages followers to develop beyond expectations (Burns, 1978; Bass, 1985; Tichy & Devanna, 1986; Sergiovanni, 1991). Transformational leadership bonds leader and followers within a collaborative change process that impacts on the performance of the whole organization resulting in a responsive and innovative environment. In contrast, transactional leadership does not bind leaders and followers in any enduring way and promotes a routinized, non-creative but stable environment.

THE RELATIONSHIP BETWEEN TRANSFORMATIONAL AND TRANSACTIONAL LEADERSHIP

Burns (1978) envisaged transformational and transactional leadership on opposite ends of a continuum implying a polarized, unidimensional relationship between the two. This differentiation of transactional versus transformational leaders paralleled an earlier distinction made by Zaleznik (1977) between managers and leaders. Zaleznik (1977) observed, "managers and leaders are very different kinds of people. They differ in motivation, personal history, and how they think and act" (p.70). Such earlier conceptions of managers and leaders implied a dichotomous relationship between the two kinds of leadership. Bennis and Nanus (1985) believed the two were qualitatively different and they

captured the essence of the distinction by their phrase "managers do things right, and leaders do the right thing" (p.21). The linking of the concepts of managers and transactional leaders to bureaucratic behaviors and their identification with ordinary leadership has imputed a value judgement favouring transformational over transactional behaviors.

The need to distinguish between managers and leaders has arisen out of a recent paradigm shift in the area of leadership (Louis & Miles, 1990). Louis and Miles (1990) have described this shift as the need to move from bureaucratic models of leadership to more adaptive models. They characterized adaptive models as vision-driven emphasizing shared decision making and collective problem solving. Adaptive models require more skills attributed to "leadership" to provide for constant learning and evolution. Bureaucratic models were described as goal directed, emphasizing control and accountability through standardized operating procedures. They require more skills attributed to "management' to provide for maintenance and continuity. By differentiating between leadership and management, Louis and Miles (1990) did not intend to imply that one subsumes or assumes the other. Those in positions of authority can choose to employ strategies perceived as falling into a "leader" or "manager" category enabling adaptive and bureaucratic models to be distinguished in terms of leader behaviors. For educational restructuring, Louis and Miles (1990) advocated adaptive models of organizational functioning where more leadership and better management are required. This relationship between leadership and management can be described as orthogonal: management and leadership are independent variables that have no correlational relationship to each other.

Kotter (1988, 1990) subscribed to this view when he pointed out that management and leadership are both characterized by important processes that sometimes can be carried out effectively by the same person. Some people can be both effective managers and effective leaders. For Kotter, the leader/manager difference and the transformational/transactional leadership difference are very similar. However, he rejects the current widely held belief that leadership is "good" and management is "bad". The essential function of "leadership" for Kotter is to produce appropriate change, whereas "management" is used to maintain operations of the current organization.

There has been some controversy over the degree of the differences between management and leadership (Yukl, 1989) which has implications for the concepts of transformational and transactional leadership. Some have argued that the constructs are qualitatively different (Bennis & Nanus, 1985), even mutually exclusive (Zaleznik, 1977), while others perceive them to be interdependent (Hunt, 1991; Duigan, 1988) stating that transformational leadership finds expression through the management/transactional processes. There is a growing consensus that management and leadership are separate but correlated concepts. Good managers are more likely to be better leaders and good leaders are more likely to be good managers. This differs somewhat from Bass's (1985) view of transformational and transactional leadership. Although a transformational leader may use transactional behaviors effectively when appropriate, it does not follow that a transactional leader will be able to draw on transformational skills. Transformational behavior is conceived as higher-order

behavior in a developmental sense and, presumably, its emergence depends on experience and learning.

Bass (1985) developed a transformational/transactional leadership model for use by organizational leadership researchers. Unlike Burns, Bass (1985) conceived of transformational leadership and transactional leadership as separate and related. "Management is not only leadership nor is leadership only management" (Bass 1985, p.xiii). Transformational leadership does not replace transactional leadership but augments it in achieving the goals of the leader, follower, and organization. The effective leader integrates transactional and transformational leadership behaviors (Bass & Avolio, 1990). However, Bass's reference to Zaleznik's work on managers and leaders to support the structure of transformational and transactional leadership assumes a dichotomous relationship between the two (Bass, 1985, p.229-230). The nature of the relationship between transformational and transactional leadership appears unclear. The problem may arise because Bass's model of leadership overlays a developmental notion of leadership over a dichotomous definition of the two constructs.

This study set out to test the degree of overlap between operational definitions of transformational and transactional leadership and the nature of the relationships between the constructs of transformational and transactional leadership and specified outcomes in an empirically derived data set by the application of two forms of analysis. It was hypothesized that the contrasting underlying structure of the relationships between transformational and transactional leadership associated with applying canonical analysis and partial least squares analysis would result in two path models, the relative fidelity of which could be compared. Cronbach (1984) referred to the fidelity of a model as an indicator of its correspondence to the real world. Canonical analysis tests the strength of the relationships between the set of predictor and criterion variables while requiring orthogonality between each pair of canonical variables extracted. Partial least squares path analysis (PLS) is used to examine causal relationships between explanatory and criterion variables and since it employs a partial least squares method of analysis, its assumptions and demands are less rigid and the latent constructs of transformational and transactional leadership are allowed to be correlated. It is argued that when both forms of analysis are applied to the same data, the mode of analysis which examines those structural relationships more in tune with the empirical data will result in an arguably superior causal model of the relationships between the predictors and the criteria.

CONCEPTUAL FRAMEWORK

Bass's (1985) model of transformational and transactional leadership was used as the conceptual framework for this study. Bass has recommended transformational leadership for successful organizational change and improved performance (Bass, 1985; Bass & Avolio, 1988, 1990). The transformational leader motivates followers to perform beyond expectation. There are three factors that determine the behavioral components of transformational leadership and define it (Bass, 1985; Waldman, Bass & Einstein, 1987).

Charisma/inspiration -- This factor is the degree to which the leader creates enthusiasm in followers, sees what is really important, and transmits a sense of mission to the organization. The leader inspires loyalty and devotion, instills pride and faith, and commands respect. Followers place a great deal of trust and confidence in the leader's vision and values, develop intense feelings about the leader, perceive the leader as a role model, and want to identify with him or her (Bass, 1985).
Intellectual stimulation -- This factor is the degree to which the leader provides intellectual and problem-oriented guidance. The leader arouses followers to think in new ways (Bass, Waldman, Avolio & Bebb, 1987). Followers are encouraged to question their own and others' assumptions, beliefs and values, and develop independent problem-solving capabilities.
Individualized consideration -- This factor is the degree to which the leader is concerned with the individual needs of followers (mentoring). The leader responds to individual differences in followers' needs for growth and development, elevating needs and abilities to higher levels when appropriate, and delegating projects to stimulate individual learning experiences.

The transactional leader motivates followers to perform at their levels of expectation and to achieve satisfaction of basic needs. Transactions are at the heart of the interchange between leader and followers. There are two factors that determine the behavioral components of transactional leadership and define it (Bass, 1985; Waldman, Bass & Einstein, 1987).
Contingent reward -- This factor is the degree to which the leader makes clear what the follower must accomplish in order to be rewarded. The leader provides rewards if followers perform in accordance with contracts or expend the necessary effort to meet performance standards. Clarification of goals, work standards, and assignments are emphasized. Leaders recognize what subordinates need and, through extrinsic rewards, energize followers to reach objectives.
Management-by-exception -- In its active form, this factor involves the degree to which the leader provides negative feedback for failure to meet agreed-upon standards. The leader avoids giving directions if the old ways are working and allows followers to continue doing their jobs as always if performance goals are met. In the the less active form of transactional leadership, the leader intervenes only when standards are not being met.

Bass (1985) contended that most leaders exhibit both transformational and transactional leadership, in varying degrees. Transformational leadership augments transactional leadership by focusing on the development of followers as well as addressing the goals of the leader, follower, group, and organization (Bass & Avolio, 1990). For Bass, the success of a transformational leader is demonstrated both by increased performance outcomes and the degree to which followers have developed their own leadership potential and skills. Bass and Avolio have stated that "although transformational leaders can be transactional when appropriate, transactional leadership is often a prescription for lower levels of performance or nonsignificant change" (1990, p. 17).

ORTHOGONAL VERSUS CORRELATIONAL STRUCTURE

Bass's (1985) conceptualization of transformational and transactional leadership finds support in Zaleznik's (1977) view of a dichotomous relationship between managers and leaders. The leader/manager concepts are paralleled by the transformational/transactional concepts. "Managers and leaders are very different kinds of people" and they develop different kinds of cultures: managerial and entrepreneurial (Zaleznik, 1977, p. 70). Bass and Avolio (1990) have also suggested that transformational and transactional leaders are "different kinds of people" and that transformational leaders are more likely to emerge as leaders in times of growth, change, and crisis. Transactional leaders work to preserve the *status quo* and find support within a more mechanistic bureaucratic organization. Although this view of transformational and transactional leadership appears to suggest an orthogonal relationship between the two constructs of leadership, both kinds of leadership skills can be found in one leader and a dependent relationship is postulated between the different behaviors. Bass and Avolio have stated that "the optimal leader is one who integrates both transactional and transformational leadership approaches; effective transactional leadership forms a broad base upon which transformational leadership can build to achieve optimal performance" (1990, p. 7).

Yukl (1989) pointed out that it was stating the obvious to say that a person can be both a manager and a leader and also a leader without being a manager, and a manager without being a leader. However, a transformational leader is not a transactional leader, since the terms are used to describe predominant behaviors. What is more, transformational leadership has been found to enhance significantly organizational outcomes beyond levels achieved with transactional leadership (Hoover, 1988; Bass & Avolio, 1990; Silins, in press). Such results have been found using canonical analysis and principal components factor analysis, which assumes orthogonality of the two kinds of leadership. Yet the transformational and transactional concepts are described as related, one building on the other, and an optimal leader is described as using both behaviors effectively (Bass & Avolio, 1990).

It would appear that there is some confusion over the nature of the relationship between the two types of leadership, and whether transformational and transactional leadership satisfy an orthogonal relationship or are positively or negatively correlated. It seems important that data be analyzed in such a way that the nature of the relationship between the two types of leadership is specifically examined.

DATA SOURCE FOR THE STUDY

The British Columbia Ministry of Education introduced in 1989 a wide ranging school reform policy that focussed on the first three years of schooling. The policy entitled "The Primary Program," was developed in response to recommendations of the Sullivan Royal Commission report, 1989. This policy represented the first step of a sequence of three closely related policies planned for implementation by the Year 2000. Survey data measuring perceptions of school personnel on a number of aspects of the Primary Project were collected in 1991 by the Center for Leadership

Development, Ontario Institute for Studies in Education, University of Toronto, under the auspices of the Head of Center, Professor K. Leithwood. A random sample, stratified by size, was drawn from half the school districts in British Columbia. A total of 679 individual teacher responses to the survey were averaged to provide 256 school scores. The school was the unit of analysis since this study employed school outcomes as the criteria against which the predictors were tested. Access to this data base enabled the author to carry out these analyses.

VARIABLES IN THE STUDY

In accordance with Bass's model (1985), transformational leadership was represented by three variables: charisma/inspiration, intellectual stimulation, and individual consideration. Transactional leadership was represented by two variables: contingent reward and management-by-exception. The variables associated with transformational leadership and transactional leadership have been defined as theoretical factors above.

Four variables were chosen to represent the school improvement outcomes: school effects, teacher effects, program and instruction effects, and student effects.

School effects. This variable encompassed perceived changes from the school improvement process impacting on the school as a whole and related to the functioning, climate and direction of the school.

Teacher effects. This variable encompassed perceived changes from the school improvement process impacting on teachers.

Program and instruction effects. This variable encompassed perceived changes from the school improvement process impacting on school programs and instruction.

Student effects. This variable encompassed perceived changes from the school improvement process impacting on students.

PROCEDURE

Two different methods of analysis involving different underlying assumptions and different structural models were used to analyze the data set. First, the relationship between the set of dependent variables and the independent variables was examined using canonical analysis which forces orthogonality on the relationships between the pairs of canonical variables. This analysis allows recombinations of the observed variables of both sets to achieve a maximally correlated linear combination of dependent variables with a linear combination of independent variables. The first pair of linear combinations yields the highest canonical correlation (R_C) possible in a given set of data. The second pair of canonical variables are then based on linear combinations of dependent and independent variables that are not correlated with the first pair and that yield the second largest R_C possible in the data to a maximum of four in this analysis (number of variables in the smaller set). Usually only the first two or three combinations are significant and need interpretation. Canonical analysis provided information about the number and nature of mutually independent relations between the two sets of observed variables and about the degree of redundancy between the two sets (Keeves, 1986). The analysis was performed using SAS CANCORR (SAS Institute Inc., 1986).

The second analysis applied to the same data was partial least squares path analysis performed using LVPLS (Lohmoeller, 1987). This analysis can be used more flexibly with regard to assumptions of distribution and independence. LVPLS allows the latent constructs of transformational and transactional leadership to be correlated. The LVPLS procedure is based on the use of ordinary least squares estimation procedures. It calculates an estimate for each latent variable which is derived from the corresponding observed variables thus partitioning the hypothesized inner model into its component constructs. Once the program has assigned these values for each latent variable, the paths between the latent variables are computed by calculating least squares estimates for all variables (observed and latent) in the model.

RESULTS

Since a stratified cluster sample of schools within districts was employed, and not a simple random sample, the number of schools responding cannot appropriately be used in the significance tests applied to the analyses carried out.

Canonical Analysis

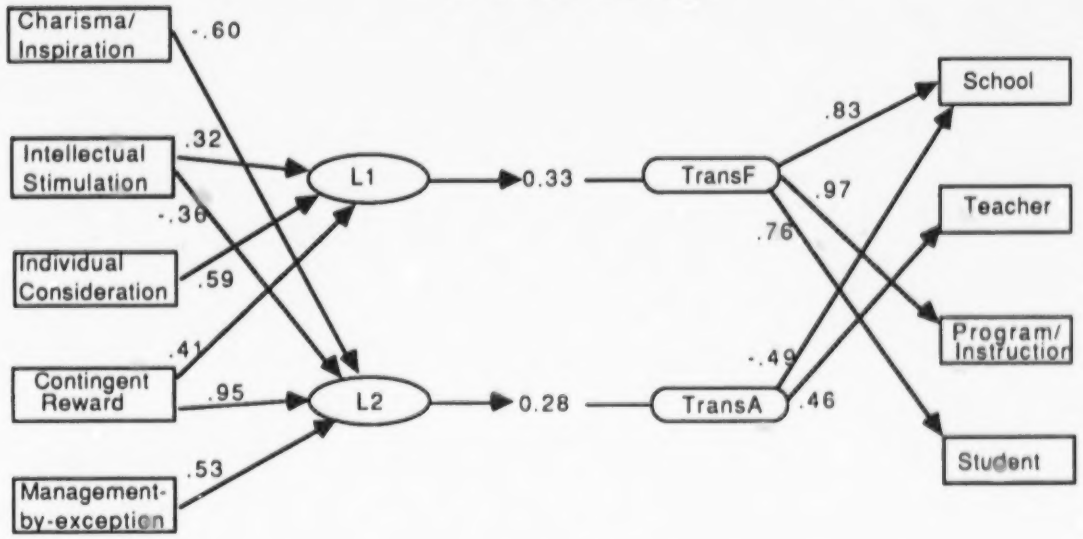
Table 1 in the appendix records the results for the testing of successive latent roots in the canonical correlation analysis of the survey data comprising five predictor variables and four criterion variables. From the analysis reported, the first two canonical correlations are almost certainly significant even if allowance could be made for the fact that the schools do not form a simple random sample. Thus the predictor variables are related to the criterion measures in two significant ways.

Table 2 in the appendix records the transformation weights and the structure coefficients for the two sets of variables related by significant canonical correlations. Conventionally, only those structure coefficients in excess of 0.30 and transformation weights in excess of 0.20 are worthy of consideration and are underlined in the table. Generally, transformation weights in excess of 0.20 are associated with more than approximately four percent variance explained. The first canonical variable has associated with it 55 percent of the variance of the criterion measure, and six percent of this criterion variance is explained by the predictor variables. The second canonical variable has associated with it only 13 percent of the variance of the four criterion measures and less than one percent of this criterion variance is accounted for by the predictor variables. The total criterion variance explained by the predictor variables using canonical analysis is 7 percent.

Figure 1 presents the resulting canonical analysis path model representing the data under the assumption that transformational and transactional leadership are orthogonal constructs. The path diagram for this analysis follows an approach advanced by Van de Geer (1971) and presented in Keeves (1986). The model postulates that the predictor variables determine the two latent canonical variables of transformational and transactional leadership. The criterion variables are completely

determined by the four latent variables of the canonical analysis, but only the two significant latent variables are shown in the diagram.

Figure 1: Path Model for Canonical Analysis of Leadership Influence on School Outcomes



Transformational leadership abbreviated to TransF
Transactional leadership abbreviated to TransA

Partial Least Squares Path Analysis

Table 3 in the appendix presents the direct, indirect and total effects , latent variable correlations with corresponding percentage of variance explained which were obtained through LVPLS analysis. In the formation of a causal model of factors influencing the school improvement outcomes of school effects, teacher effects, program and instruction effects and student effects, outer and inner models were hypothesized. As a first step, the estimation mode (inward or outward) is defined indicating whether observed or manifest variables (MVs) are combined to form or to reflect a particular latent variable. The inward mode increases the predictive power of the model. The outward or reflective mode primarily aims at extracting the common characteristics of the observed variables in a construct and increasing the internal consistency of the latent variable. The outward mode applied to transformational leadership results in the MVs being assigned factor loadings as the reflected latent variable is estimated using a principle component or factor analytic approach. The inward or formative mode applied to transactional leadership results in standardized regression weights (ß) being assigned to the MVs since the latent variable formed is estimated using a least squares regression approach. Singleton variables are always represented in the reflective mode. Thus school, teacher, program and student effects are all in the reflective or outward mode.

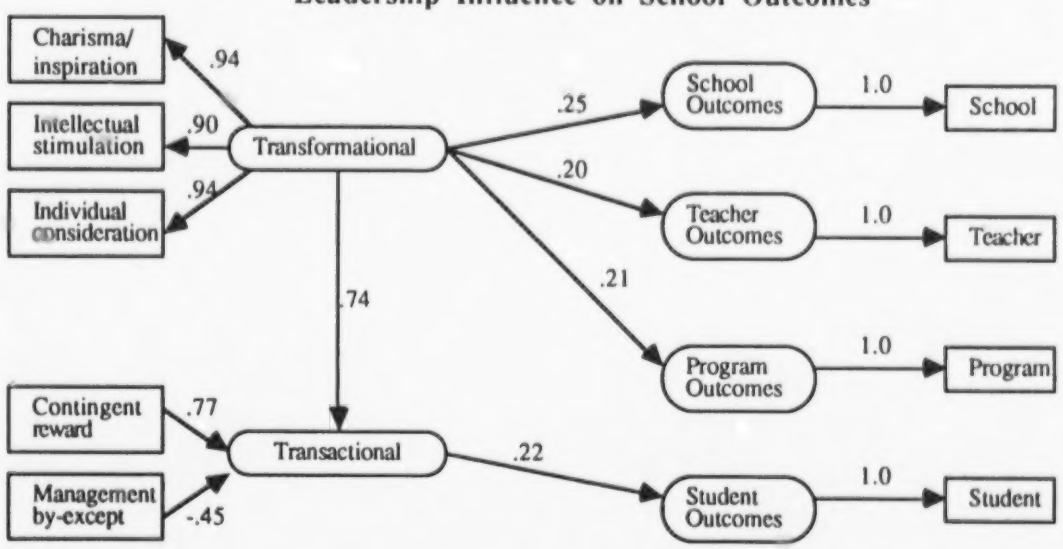
The outer model relationships are estimated by LVPLS and having estimated the outer model, the program goes on to estimate the inner model, and continues to iterate until convergence is achieved. Once the outer model is stabilized, the path estimates for the inner model can be examined. The inner

model comprises the relationships which are specified among the latent variables (LVs). Initially a fully recursive model is specified and the inner model is refined successively as paths which do not contribute to explaining another LV are deleted.

It is widely recommended to exclude MVs from the outer model equation if their weight becomes <0.10 or if their loading is <0.40 (Pedhazur, 1982, Keeves, 1992). To determine when path coefficients are to be accepted as significant or rejected as insignificant with complex sampling, twice the standard error for correlation coefficients for a simple random sample of schools was used in order to be reasonably conservative in applying cut-off criteria. For N = 256 this results in a $p \geq 0.13$ ($1/\sqrt{N}$ by 2). Path coefficients at or below 0.13 are considered trivial. It should be noted that the problems of statistical significance of paths are generally treated differently in canonical analysis and latent variable path analysis. The former follows a factor analysis tradition and the latter a regression analysis tradition in the situation encountered in this study where a highly complex sample design was employed.

Figure 2 presents the resulting partial least squares path model representing the data under the assumption that transformational and transactional leadership are related constructs. The outer and inner model paths of the final model obtained using LVPLS analysis are shown in Figure 2. It is necessary to draw attention to the fact that the paths between Transformational leadership and Student Outcomes, and between Transactional leadership and School, Teacher and Program Outcomes were non-significant ($p \leq 0.13$).

Figure 2: Path Model for Partial Least Squares Analysis of Leadership Influence on School Outcomes



An important part of model evaluation is the examination of fit indices reflecting the predictive power of estimated inner and outer model relationships. The indices of fit of a model to the observed data used to examine the overall strength of a PLS model are: the mean of squared multiple correlations of

endogenous LVs (0.18); the root mean square of the covariances between the residuals of the MVs and the residuals of the LVs and MVs (RMS Cov(E,U) = 0.029); the redundancy coefficient (0.17); the reliability coefficients of Tucker-Lewis (0.61) and Bentler-Bonett (0.87); the communality coefficient (0.87) (Sellin & Keeves, in press). The variances of the criterion variables explained by the model as indicated in Table 3 were School effects 9 percent, Teacher effects 7 percent, Program and Instruction effects 10 percent and Student effects 7 percent. The average criterion variance explained by the predictor variables using PLS is 8.2 percent.

DISCUSSION

Partial least squares analysis indicated a strong positive relationship between transformational and transactional leadership with transformational leadership explaining 55 percent of the variance in transactional leadership. This fits Bass's developmental notion of transformational and transactional leadership and the more recent conceptions of leadership. If optimal leaders are integrating transformational and transactional behaviors then the negative relationship of management-by-exception to transactional leadership seen in the data also supports Bass's model and the emerging view that important leadership processes are identified by both concepts. Management-by-exception appears to be a negative or passive form of leadership that is more akin to non-leadership.

The path model based on the assumption of a correlated or causal relationship between variables (LVPLS) indicated clearly the integrated nature of the two concepts of leadership in terms of their impact on school improvement outcomes. Transformational leadership has significant direct influence on school, teacher and program outcomes, but the impact of transformational leadership on students is indirect and through transactional leadership, that is, the "organizational" (Kotter, 1988) aspects of leadership that result in the establishment of clear roles and expectations, planning and scheduling and managing the environment of the school. This has been expressed in the following way : "Transactional leadership practices help teachers recognize what needs to be done in order to reach a desired outcome . . . . increases teachers' confidence and enhances motivation" (Leithwood, Jantzi, Silins & Dart, 1992). This PLS model supports recent notions of the way transformational leadership is manifested in schools. Manasse (1986) noted that research has demonstrated that "leaders lead as they manage" (p. 153), a view supported by others (Duigan, 1988; Kotter, 1988). Principals' on-going daily tasks and interactions provide opportunities to keep a finger on the pulse of the school and the people in it, to plant their ideas, convey their vision and suggest interpretations of events. Dwyer et al (1985), Manasse (1984, 1986), Martinko & Gardner (1983), Morris et al. (1981) have all demonstrated that the actual observed activities of principals vary remarkably little between highly effective and relatively ineffective leaders. The difference in their impact on their school "appears to come not from what the individuals 'do' during the day, but from how they think about what they do, how they communicate how they think, and what they 'do' while they are 'doing' it" (Manasse, 1986, p. 153-154). Effective principals use activities of management to accomplish the goals of leadership.

By forcing an orthogonal relationship between transformational and transactional leadership, canonical analysis gave rise to two latent leadership variables L_1 and L_2 concerned with transformational and transactional leadership respectively. Charisma/inspiration and intellectual stimulation are negatively correlated to the second latent variable (transactional) together with a positively correlated management-by-exception and highly positively correlated contingent reward. At the same time contingent reward also contributed positively to the formation of the first latent leadership variable (transformational). There exists a link between the two constructs of leadership through the contingent reward variable. Bass in a personal communication to the author (April 28, 1992) suggested that two forms of contingent reward operated in defining the transformational and transactional latent variables. The "psychic" rewards exchanged "concern development, praise, or recognition . . . . fall into individualized consideration which in turn is highly correlated with other transformational factors. A purely transactional contingent reward is a pay increase or a bonus." In this same communication, Bass indicated that partial least squares path analysis rather than factor analysis resulted in the unambiguous separation of the defining or manifest variables associated with the leadership constructs. The assumption of orthogonality does not appear to be theoretically specified nor supported by these analyses. What is more, the identified orthogonal transactional leadership explains only one percent of the variance in the criteria variables (the transformational leadership variable explains 6 percent). Yammarino and Bass (1990) have pointed out that a problem with studies of leadership is the "typically small amount of variance explained by any particular investigation" (p. 993). This study indicates that such disappointing past results may be due to the choice of analysis. Most empirical studies have employed factor analysis and regression analysis assuming independence of variables (Bass, 1985; Hoover, 1988; King, 1989; Bass & Avolio, 1990; Silins, 1992). Partial least squares path analysis explained on average, 8.2 percent of the criterion variance, marginally more than the total of percent explained by canonical analysis. If a test of Cronbach's fidelity is the amount of variance explained by the two models generated by the data under the differing assumptions, then LVPLS is a marginal improvement.

While the comparative fidelity of the two resultant models is difficult to resolve statistically, evaluation of the two models is possible by weighing up the nature of the relationship between leadership constructs and school improvement outcomes offered for interpretation by each model. Figure 1 and Figure 2 help to illustrate the idiosyncrasies of the two perspectives with their different explanatory powers. Both path models indicate that transformational leadership has the more generalized and stronger influence over school improvement outcomes whether the two forms of leadership are viewed as orthogonal or correlated. This helps justify the current emphasis on transformational forms of leadership for improving school performance and for school reform (Leithwood & Jantzi, 1990; Silins, 1992; Leithwood, Jantzi, Silins & Dart, in press). The nature of the influence of transformational and transactional leadership, however, differs radically in the two models.

In Figure 1 (canonical analysis), transformational leadership impacts on school, program and instruction, and student outcomes directly and strongly. Perplexingly, transformational leadership (when viewed as independent of transactional leadership) has no direct effect on teacher outcomes. Transactional leadership influences teacher outcomes positively and directly while influencing school effects (whole school functioning, climate, culture, direction) negatively. The author has attempted to explain this apparent contradictory impact of transactional leadership more fully elsewhere (Silins, 1992). Briefly, it was hypothesized that, to the extent that transactional leadership could be seen as a more passive form of leadership than transformational, its presence in a school may empower and develop teachers by providing them with more decision making opportunities through the leader's default of responsibilities. This was also seen as explaining the negative influence on school effects of transactional leadership when viewed as the abrogation of the recognized and necessarily active role of the leader for improved school performance (Sashkin, 1988; Beare, Caldwell & Milliken, 1989; Fullan, 1991). This contradictory impact of transactional leadership can provide the basis for a more sinister interpretation of these results; that the kind of leadership that is good for teachers is not necessarily good for the whole school; that teachers' interests are not compatible with the school's interests. This present study casts doubt on the validity of such a hypothesis, and perhaps others that have been imaginatively presented to explain results obtained under mistaken assumptions about the nature of the relationship between transformational and transactional leadership.

In Figure 2 (partial least squares analysis), transformational leadership influences school, teacher, and program and instruction outcomes directly and strongly. However, since this form of analysis allows transformational and transactional leadership to be correlated, the data in this study indicate that transformational leadership strongly influences transactional leadership, which in turn impacts on student outcomes. It has been noted that over half of the variation in transactional leadership in these data is explained by transformational leadership. Transformational leadership, therefore, is a strong indirect influencer of student outcomes. This model indicates relationships between leadership and school outcomes that generate interpretations that fit better with our understanding of the real world, and thus have greater fidelity.

CONCLUSION

This study presents evidence for the positive, correlational nature of the relationship between transformational and transactional leadership. It casts strong doubts on the meaningfulness of using analyses assuming an orthogonal relationship between transformational and transactional leadership as independent variables. Comparison of the relative fidelity of each of the two path models presented has resulted in providing greater support for the correlational view of the nature of the relationship between transformational and transactional leadership than for the orthogonal view. This has been achieved by examining: the structure of the two leadership concepts, the assumptions and the procedures underlying the two modes of analysis, and the relationships between leadership and school improvement outcomes as presented in the two path models.

In addition, this study has demonstrated that applying analyses with contradictory underlying assumptions to the same data for comparative purposes can have illuminating consequences. Where contradictions exist in the understanding of the nature of theoretical constructs being used, some clarity can be achieved by analyzing the data in more than one way.

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APPENDIX

Table 1: Canonical Correlations Between Predictors and Criteria

No. of roots removed	Canonical R	R^2	Approx F	df	*P*
0	.33	.11	3.07	20	<.001
1	.28	.08	2.63	12	<.019
2	.18	.03	1.78	6	NS
3	.10	.01	1.22	2	NS

NS = Not Significant

Table 2: Transformation Weights and Structure Coefficients for Canonical Analysis between Predictors and Criteria

	Transformation weights*		Structure Coefficients**	
Predictor measures	U_1(TF)	U_2(TA)	U_1(TF)	U_2(TA)
Charisma/inspiration	-.20	-.60	.80	-.37
Intellectual stimulation	.32	-.36	.82	-.43
Individual consideration	.59	.18	.93	-.11
Contingent reward	.41	.95	.87	.32
Management-by-exception	-.01	.53	-.41	.64
Variance extracted			.62	.17
Criterion measures	V_1	V_2	V_1	V_2
School effects	.35	-1.32	.83	-.49
Teacher effects	.04	.23	.04	.46
Program and instruction	.74	.65	.97	.21
Student effects	-.01	.61	.76	.17
Variance extracted			.55	.13
Canonical R			.33	.28
Canonical R^2			.11	.08
Redundancy			.06	.01

*Transformation weights > 0.20 are underlined
**Structural coefficients > 0.30 are underlined

Table 3: Direct Indirect Total Effects and Latent Variable Correlations

Variables	Direct Effects	Total Effects	Indirect Effects	Correlations
Student Outcomes				
Transactional	0.22	0.22	*	0.26
Transformational	0.05	0.22	0.17	0.22
Variance explained 7%				
Program and Instruction Outcomes				
Transactional	0.12	0.12	*	0.28
Transformational	0.21	0.30	0.09	0.30
Variance explained 10%				
Teacher Outcomes				
Transactional	0.07	0.07	*	0.22
Transformational	0.20	0.26	0.06	0.26
Variance explained 7%				
School Outcomes				
Transactional	0.08	0.08	*	0.26
Transformational	0.25	0.30	0.05	0.30
Variance explained 9%				
Transactional				
Transformational	0.74	0.74	*	0.74
Variance explained 55%				

* Path coefficient r<0.10.
Note: LVs with all paths p<0.10 not reported.